

## NPIC ROUTING SLIP

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FROM: *112*DATE: *20 Mar*

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DEP/DIR	<i>2</i>		<i>3-22</i>							
EXEC/DIR	<i>1</i>		<i>27 Mar</i>							
ASST FOR OPS	<i>4</i>		<i>31 Mar</i>							
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TCS-1619-64/KH  
26 March 1964

Copy 1

MEMORANDUM FOR: Executive Director, NPIC

SUBJECT: Summary of Programming Efforts for  
KH-7 and KH-6 Collection Systems

As per your request, attached are two memorandums - one covering the development of the KH-6 programming effort, the second a summary of the KH-7 programming effort to date.



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Chief, Technical Intelligence Division

Attachments:

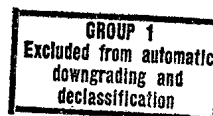
TCS-1617-64/KH (cy 1&2)  
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TCS-1617-64/KH  
26 March 1964


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MEMORANDUM FOR THE RECORD

SUBJECT: TID Programming Effort for the KH-6 System

1. The requirement that we prepare the frame ephemerides for the KH-6 System was received in the Branch about 1 February 1963. At that point there were five mathematician/programmers in the Branch. Of this group only one could properly be styled an experienced programmer. A sixth individual was working purely as an applied mathematician and was immediately given the assignment of formulating the most expeditious method of determining vehicle position as a function of time. At the same time, the five mathematician/programmers plus two people on loan from TAB were started on various routines that were needed to handle other aspects of the overall system for frame ephemeris production. This group of eight worked full time plus a substantial amount of overtime on this project through the month of May. (During the period between 1 February and the announcement that the KH-6 system was discontinued, seven new mathematician/programmers joined the Branch but were not of any help in developing the system due to their almost complete lack of experience.) With the completion of various component programs of the system the level-of-effort during June and July was reduced to approximately four persons full time. With the completion of a frame ephemeris for the first successful KH-6 mission, a re-design of the system was begun with the intention of making it a universal system.

2. Other than for experience gained the effort toward the KH-6 system can be written off as a complete loss. Since speed of accomplishment was the prime consideration, the system design was keyed to this theme rather than to evolving a more general-purpose system.

  
Chief, Technical Intelligence Division

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26 March 1964Copy 1

## MEMORANDUM FOR THE RECORD

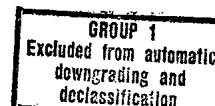
SUBJECT: TID Development of KH-7 Math Model and Computer Program

1. One of the difficulties faced by the Computer Branch in the development of a computer system for the KH-7 vehicle was lack of trained programmers who were familiar with the mathematical concepts of strip photography from an orbiting vehicle. To the best of our knowledge, no analysis has been accomplished by anyone on the geometry and reduction of mensural data from such a system. The techniques used for data reduction of panoramic photography do not readily adapt to strip photography.

2. In the summer of 1963 when detail information on this system became known, an analyst was assigned to analyze and develop a model to mathematically describe a data reduction process. By late September it became apparent that the system being evolved would not lend itself to computer programming and, therefore, a new approach had to be taken. At this point the analyst who had been working on this problem resigned, leaving us with little results for three months' effort.

3. At this time, the major programming effort was being placed on two more pressing problems: the development of a Real-Time system and the KH-4 photo measurement program. These two efforts absorbed the entire Computer Branch effort until mid-December. Working in parallel, a TAB analyst evolved a new KH-7 math model and after a careful review, it was revised and immediately assigned for work in the first week of December.

4. Since then, the development has been going on with a minimum of two programmers. The system could not be subdivided further for assignment to more programmers, because they would be burdened with too much coordination. The program has progressed rapidly and is, at the present, in the debugging stage. The math model, once again developed by an inexperienced computer orientated analyst, has presented only minor difficulties in concept and design. Current prediction for completion of the first operational system is the first of May. Though we have a high confidence in achieving our objective, success of this pioneering effort will remain uncertain until tested.

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SUBJECT: TID Development of KH-7 Math  
Model and Computer Program

TCS-1618-64/KH

5. In reviewing the difficulties that hampered the development of this system, it was noted that there were two basic weaknesses in the Branch. The first was the lack of understanding of the mathematical principals and definitions needed to describe the physical problem in a mathematical model for computer system reduction. This is being vigorously attacked by formal education. All personnel in the Branch are attending the Analytical Photogrammetry Course. The second is building up a trained staff. In the past year, the number of programmers has risen from five to 26. (This includes 14 contract types.) Not only have we attracted very competent college graduates, but they have in a very short time gained valuable experience in the programming and designing of sophisticated computer programs. To date we have been able to attract only two experienced people. Within a year, we anticipate our current personnel will be as experienced as any we can expect to hire from the outside.



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